

Providing Unmatched Lethality to the Future Force

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The Non-Line-of-Sight Launch System (NLOS-LS) provides unmatched lethality and versatility for the Army's Future Combat Systems (FCS) and provides the next "leap ahead" missile capability for U.S. forces. NLOS-LS is a core FCS system that will operate as an integrated node on the FCS System-of-Systems network to meet the requirements of the Army's Future Force Unit of Action (UA).

NLOS will provide unmatched lethality and versatility for FCS and will include the PAM to defeat both armored and nonarmored targets, and the LAM, to defeat nonarmored high-value targets. Here, an NLOS Cannon fires a 155mm projectile at Yuma Proving Ground, AZ. (U.S. Army photo courtesy of YPG.)

The NLOS-LS is a self-contained system that provides Modular Brigade Combat Teams (MBCTs) and UA commanders with their own precision or loitering attack missile capability. It consists of a family of missiles and a highly deployable (strategic and tactical), platform-independent Container Launch Unit (CLU) with self-contained tactical fire control electronics and software for remote, unmanned operations.

The NLOS-LS family of missiles currently includes the Precision Attack Missile (PAM) and the Loitering Attack Missile (LAM). The PAM focuses on defeating a variety of both armored and nonarmored targets, including small boats. The LAM focuses on defeating nonarmored fleeting, high-value targets, while also supporting networked fires by providing both targeting information and battle damage assessment (BDA) to enhance the FCS network's Common Operating Picture (COP). Future missiles may include air defense and nonlethal variants.

The NLOS-LS CLU holds All Up Rounds (AURs) — consisting of a missile plus a transportation/firing missile container — in a four-by-four matrix, with the sixteenth socket holding the computer and communications system (CCS). The CCS contains all fire mission processing and communication components, including antenna, position locating, weapon interface, power supply and anti-tamper capability.

The CLU's primary role is to act as the transportation and firing platform for the AURs. The AURs can be fired while on a ground/sea transport vehicle or from a ground emplacement, using

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command and control information received via a wireless link using a Joint Tactical Radio System Cluster V radio loaded with the Soldier Radio Wave-

form. Operating as a node on the FCS network, the CLU can feed target data to the FCS COP, along with location and quantity of AURs available for use. The NLOS-LS has the built-in flexibility to respond to calls for fire from different operational echelons or from sensors and forward observers that are capable of interacting directly with the system via the FCS or Littoral Combat

Ship (LCS) network. The NLOS-LS family of missiles will have the unique ability to accept in-flight target updates, allowing the missiles to be redirected while in flight from the FCS COP, to a higher-profile target of opportunity.

The CLU is self-sufficient and requires no operator or logistics support for extended periods of time. While on a

transportation platform, it requires no vehicular interface whatsoever, with the exception of cargo tie-down provisions. However, the CLU will be capable of receiving external supplementary power from its host vehicle via a standard NATO adapter.

Executing to Schedule

In July 2004, the Army revised the FCS program acquisition strategy.

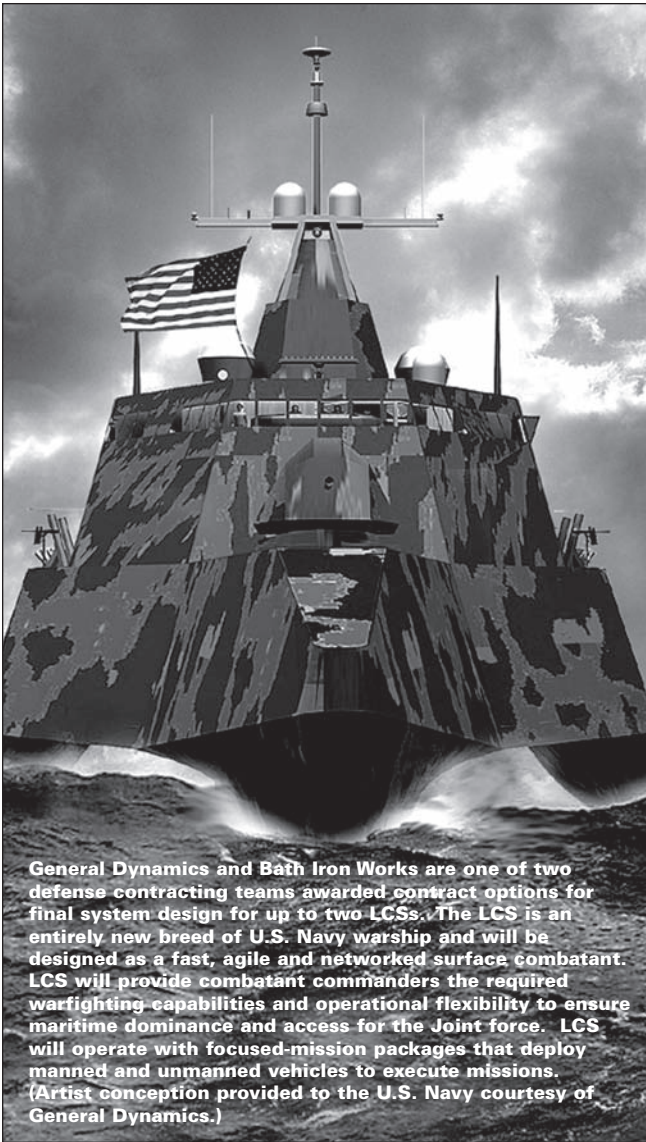
Army Chief of Staff Peter J.

Schoomaker directed that selected key FCS capabilities be provided to operational forces faster, while maintaining the momentum to develop and field an FCS-equipped UA. The NLOS-LS is one of the crucial systems identified for inclusion in the FCS Spin-Out 1 (SO1) to the Current Force.

The PAM and CLU are on schedule to accomplish this goal and the CLU is slated to be provided to the Experimental Brigade Combat Team (EBCT) for evaluation prior to a production decision. Because the NLOS-LS is an early component to demonstrate the enhanced capabilities that FCS networked fires will provide, EBCT Soldiers can

The Guided Multiple Launch Rocket System (GMLRS) was first test-fired outside the United States in summer 2005 near Tikrit, Iraq. The GMLRS was recently deployed in actual combat at Tal Afar, Iraq, against insurgent forces. Breakthroughs in SO technology are helping to rapidly integrate AFATDS communication architecture to support Current Force interoperability requirements for targeting and BDA. (U.S. Army photo.)





General Dynamics and Bath Iron Works are one of two defense contracting teams awarded contract options for final system design for up to two LCSs. The LCS is an entirely new breed of U.S. Navy warship and will be designed as a fast, agile and networked surface combatant. LCS will provide combatant commanders the required warfighting capabilities and operational flexibility to ensure maritime dominance and access for the Joint force. LCS will operate with focused-mission packages that deploy manned and unmanned vehicles to execute missions. (Artist conception provided to the U.S. Navy courtesy of General Dynamics.)

assist the NLOS-LS Project Office during its development. This Soldier interaction will provide critical user input in the development of tactics, techniques and procedures and enhance future development efforts for NLOS-LS.

The NLOS-LS program has completed the PAM System Functional Review (SFR) and was scheduled to conduct Preliminary Design Review (PDR) in September 2005. The CLU SFR was held in July 2005 and the PDR is scheduled for January 2006. The program is currently working with Project Manager (PM) Intelligence and Effects to integrate Advanced Field Artillery Tactical Data System (AFATDS) into its communications architecture

to support the SO1 Current Force interoperability requirements. The concept for AFATDS interoperability with NLOS-LS was demonstrated with message traffic originating from a forward observer through AFATDS to the NLOS-LS CLU. This successful demonstration was supported by the members of PM UA, the FCS Lead Systems Integrator (LSI) and Program Executive Office Command, Control and Communications Tactical (PEO C3T).

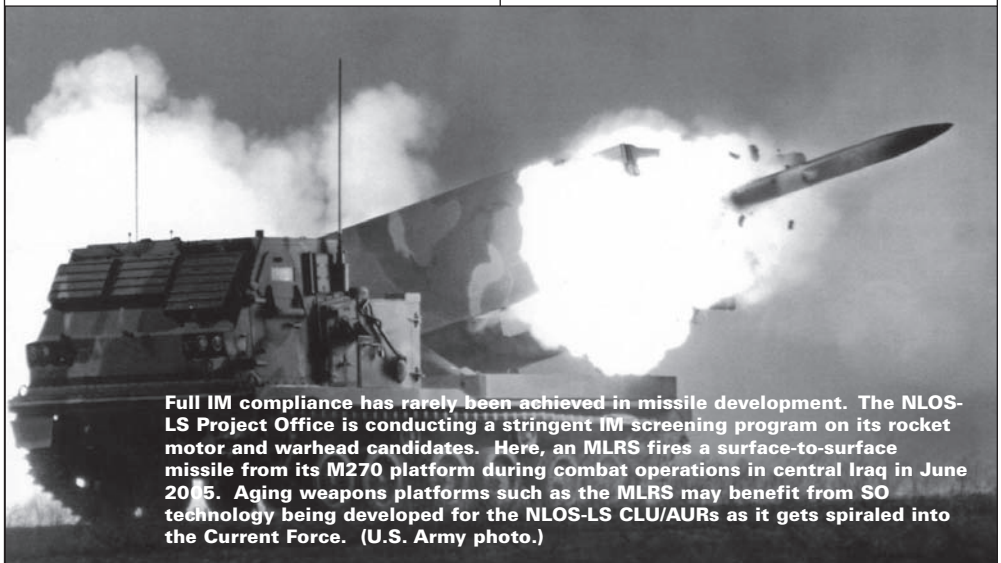
The NLOS-LS Project Office has also demonstrated deployability from a C-130 Hercules aircraft and the ability to employ the system using the Family of Medium Tactical Vehicles (FMTV) for both ground and vehicle operations.

Meeting the Challenge

In FY05, the NLOS-LS Project Office — in conjunction with its LSI

and the Navy — initiated several test activities to obtain additional information on certain key system performance specifications. The areas of concentration were network communications, Insensitive Munition (IM) compliance, warhead lethality and seeker performance. To obtain critical warhead data, the NLOS-LS Project Office tested multiple configurations of warheads to evaluate their effectiveness against the various joint target sets and select a design that meets the joint lethality requirements. These static tests evaluated both warhead penetration and fragmentation effects.

Full IM compliance has rarely been achieved in missile development. The two primary IM consideration items are rocket motors and warheads. The NLOS-LS Project Office is conducting a stringent IM screening program on its rocket motor and warhead candidates. The rocket motor alternatives were subjected to several IM screening tests for compliance to Public Law on IM. The rocket motor solution selected will be based on the ability to meet the maximum range requirement and IM compliance. These initial IM screening tests show great promise in achieving a fully IM-compliant rocket motor. Several warhead candidates are also under IM evaluation. Four



Full IM compliance has rarely been achieved in missile development. The NLOS-LS Project Office is conducting a stringent IM screening program on its rocket motor and warhead candidates. Here, an MLRS fires a surface-to-surface missile from its M270 platform during combat operations in central Iraq in June 2005. Aging weapons platforms such as the MLRS may benefit from SO technology being developed for the NLOS-LS CLU/AURs as it gets spiraled into the Current Force. (U.S. Army photo.)



SGT Dwayne Newby, 3rd Battalion, 7th Field Artillery Regiment, 25th Infantry Division (Light), and his fellow Soldiers position an M119 howitzer near Forward Operating Base Cobra, Afghanistan, in support of Operation Crackdown. Future Force systems such as NLOS will provide Soldiers with greater accuracy, lethality, versatility and mobility than current artillery pieces such as this towed howitzer. (U.S. Army photo by SPC Jerry T. Combes.)

warheads have undergone IM screening test and additional testing was scheduled in late 2005. Once all the screening tests are completed, a warhead will be selected and its final IM compliance will be determined.

To obtain additional seeker performance data, two captive flight tests were conducted against multiple naval targets with the Naval Surface Warfare Center (NSWC), Dahlgren, VA. These joint tests are providing critical data on the versatility of the Uncooled Imaging Infrared seeker to acquire targets in both ground and sea applications.

Recently, a team comprising members from the U.S. Army NLOS-LS Project Office, industry and the Navy's LCS and Mission Package Project Office, NSWC, successfully completed two major milestones related to transitioning NLOS-LS to the fleet. These included the NLOS-LS Introduction to the Weapons System Explosives Safety Review Board (WSESRB) and the NLOS-LS Introduction to the Software

System Safety Technical Review Panel (SSSTRP). The SSSTRP is a critical subset of the WSESRB. The NLOS-LS is slated for delivery to the LCS as part of the Surface Warfare Mission Package.

Midway through FY05, the NLOS-LS PAM was selected as the beyond-LOS missile solution for the Armed Robotic Vehicle-Assault (ARV-A). Since that time, there have been several technical interchange meetings to outline requirements and interfaces. An ARV-A/PAM integration Statement of Work has been developed and the ARV-A environmental performance specifications have been identified for incorporation into the PAM performance specification.

For SO1, the NLOS-LS Project Office will provide the EBCT with three FMTVs and seven CLUs with weighted AUR simulants for training and evaluation. The system will be fully functional, with the ability to enter a network and train the

operators in system employment. These same Soldiers will deploy to White Sands Missile Range, NM, and support several developmental test firings. These activities will provide the Current Force Fire Direction Center and the system operators the opportunity to fire tactical PAMs against selected targets.

The NLOS-LS Project Office is poised to provide an integrated operational system in support of the EBCT SO 1-4 evaluations, the MBCT fieldings and the Navy's LCS evaluation.

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